

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

1. (Currently amended) A ~~research~~ method ~~performed~~ for carrying out a set of experiments, the method comprising:

providing to a remote user at a first location a computer-implemented experiment design tool for generating an experiment design defining a set of experiments, the experiment design including electronic data defining an experiment matrix having a plurality of matrix elements, one or more starting materials assigned to the matrix elements and one or more process conditions to be applied to the matrix elements, each of a plurality of matrix elements being defined by a unique combination of starting materials and/or process conditions, the experiment design also including electronic data defining a screening method to be applied to generate experimental results;

receiving at a second location a first user input including a first experiment design generated by the experiment design tool, the first experiment design defining a first experiment matrix having a first plurality of matrix elements, a first set of one or more starting materials, and a first set of one or more process conditions, the first experiment design also defining a first screening method, the second location being remote from the first location;

preparing a first library of materials at the second location according to the first experiment design, the first library of materials corresponding to the first experiment matrix, the first library of materials having a plurality of members corresponding to elements of the first experiment matrix;

applying the first set of process conditions to the members of the first library of materials at the second location to transform at least one of the starting materials into ~~a~~ at least one product;

applying ~~a~~ the first screening method to the members of the first library of materials at the second location defined by the first experiment design to generate experimental results; and

providing electronic data describing the experimental results to the remote user at the first location.

2. (Previously presented) The method of claim 1, wherein:
the first screening method is a high throughput screening method.
3. (Previously presented) The method of claim 2, wherein:
the first screening method is selected from the group consisting of infrared thermography, chromatography, capillary electrophoresis, mass spectrometry, optical reflection, optical transmission, viscometry, mechanical resonators, solubility, differential scanning calorimetry, elongation, indentation, deformation or spectroscopy.
4. (Currently amended) The method of claim 1 2, wherein:
the first experiment matrix includes at least 50 elements; and
the experimental results are provided to the user within 20 days from preparation of the first library.
5. (Currently amended) The method of claim 1 2, wherein:
the first experiment matrix includes at least 96 elements; and
the experimental results are provided to the user within 10 days from preparation of the first library.
6. (Currently amended) The method of claim 1 2, wherein:
the first experiment matrix includes at least 1000 elements; and
the experimental results are provided to the user within 50 days from preparation of the first library.
7. (Currently amended) The method of claim 1 2, wherein:
the first experiment matrix includes at least 1000 elements; and
the experimental results are provided to the user within 20 days from preparation of the first library.

8. (Currently amended) The method of claim 1 ~~2~~, wherein:
the first experiment matrix includes at least 1000 elements; and
the experimental results are provided to the user within 10 days from preparation of the first library.
9. (Previously presented) The method of claim 2, further comprising:
in response to providing the experimental results, receiving a second user input including a second experiment design defining one or more additional experiments;
preparing a second library of materials based on the second experiment design;
applying one or more process conditions specified in the second experiment design to the members of the second library of materials to transform at least one of the starting materials into a product and applying a second screening method to generate additional experimental results; and
providing the additional experimental results to the remote user.
10. (Previously presented) The method of claim 9, wherein:
the second library of materials is a superset of the first library of materials.
11. (Previously presented) The method of claim 9, wherein:
the second screening method and the first screening method are different.
12. (Previously presented) The method of claim 2, wherein:
the computer-implemented experiment design tool includes an interactive user interface configured to enable the remote user to select materials from a list of materials in a remote material inventory.
13. (Previously presented) The method of claim 2, wherein:
the computer-implemented experiment design tool includes an interactive user interface configured to enable the user to select processing conditions from a list of processing conditions that can be implemented by a remote process control system.

14. (Previously presented) The method of claim 2, wherein:

the computer-implemented experiment design tool includes an interactive user interface configured to enable the user to select high throughput screening methods from a list of screening methods that can be performed by one or more screening instruments available at a remote laboratory location.

15. (Previously presented) The method of claim 2, wherein:

the computer-implemented experiment design tool includes an interactive user interface configured to access one or more databases of available materials, process conditions and high throughput screening methods.

16. (Previously presented) The method of claim 2, wherein:

the first screening method is automatically defined based on one or more of the starting materials and process conditions.

17. (Currently amended) The method of claim 2, further comprising:

evaluating the first experiment design before preparing the first library of materials to generate an experimental plan including electronic data describing a proposed execution of the set of experiments; and
providing the experimental plan to the remote user; and
receiving an input from the user in response to the experimental plan, wherein the preparing the library of materials, the applying the process conditions, the applying the screening method, and the providing the experimental results are only performed when the user approves of the experimental plan.

18. (Previously presented) The method of claim 17, wherein:

evaluating the first experiment design includes generating an estimate of time and/or cost to perform the set of experiments defined by the first experiment design.

19. (Previously presented) The method of claim 17, wherein:

evaluating the first experiment design includes determining whether the design conforms to a set of experiment parameters, and, if not, communicating to the remote user that one or more experiments defined by the experiment design cannot be executed.

20. (Previously presented) The method of claim 19, wherein:

determining whether the design conforms to the set of experiment parameters includes determining whether the assigned starting materials specified in the first experiment design are present in an inventory of materials.

21. (Previously presented) The method of claim 19, wherein:

evaluating the first experiment design includes determining whether the assigned starting materials have chemical or physical properties falling within a predetermined set of chemical or physical properties.

22. (Currently amended) The method of claim 1, wherein:

the computer-implemented experiment design tool is configured to enable the remote user to generate an experiment request for execution of the set of experiments defined by the first experiment design for submission over a computer network, the experiment request including electronic data embodying the first experiment design.

23. (Previously presented) The method of claim 22, wherein:

the first experiment design is received from the remote user over a computer network.

24. (Previously presented) The method of claim 1, wherein:

the first experiment design includes information identifying one or more custom materials assigned to one or more matrix elements; the method further comprising:

receiving the custom materials from the remote user for use in preparing the library of materials.

25. (Previously presented) The method of claim 1, wherein:

the first experiment design defines a set of experiments directed to chemicatalysis or biocatalysis.

26. (Previously presented) The method of claim 1, wherein:

the first experiment design defines a set of experiments directed to optimization of a chemical synthetic process.

27. (Previously presented) The method of claim 26, wherein:

the set of experiments is directed to the preparation of pharmaceutical products or intermediates.

28. (Previously presented) The method of claim 26, wherein:

the set of experiments is directed to the preparation of fine chemicals.

29. (Previously presented) The method of claim 26, wherein:

the set of experiments is directed to the preparation of specialty chemicals.

30. (Previously presented) The method of claim 26, wherein:

the set of experiments is directed to the preparation of commodity chemicals

31. (Previously presented) The method of claim 1, wherein:

the first experiment design defines a set of experiments directed to polymerization.

32. (Previously presented) The method of claim 31, wherein:

the set of experiments is directed to the preparation of polymeric coatings, adhesives, dispersants, surfactants or additives.

33. (Previously presented) The method of claim 1, wherein:

the first experiment design defines a set of experiments directed to the preparation of electronic materials.

34. (Previously presented) The method of claim 1, wherein:
the experiment design defines a set of experiments directed to the preparation of composites or alloys.
35. (Previously presented) The method of claim 2, wherein:
the user receives the experimental results by accessing a results database through a remote computer-implemented interactive user interface.
36. (Previously presented) The method of claim 2, further comprising:
in response to providing the experimental results, receiving a second user input from the remote user including a request to purchase a starting material or product corresponding to one of the elements of the experiment matrix.
37. (Previously presented) The method of claim 1, wherein:
the experiment design tool is provided as a computer program to be executed by a computer system at the first location.
38. (Previously presented) The method of claim 1, wherein:
the experiment design tool is provided as a computer program executed by a server process running at the second location; and
the remote user accesses the experiment design tool using a client process running at the first location.
39. (Currently amended) A computer-implemented method for obtaining experimental results for a set of experiments, the method comprising:
generating at a first location an experiment design defining a set of experiments, the experiment design including an experiment matrix having a plurality of elements, one or more starting materials assigned to the matrix elements, and one or more process conditions to be applied to the matrix elements, each of a plurality of matrix elements being defined by a unique combination of starting materials and/or process conditions,

the experiment design also defining a screening method to be applied to generate experimental results;

communicating the experiment design to a laboratory at a second location for execution, the second location being remote from the first location; and

~~receiving at the first location an experimental plan describing a proposed execution of the set of experiments;~~

~~if the proposed execution of the set of experiments is acceptable, communicating an approval of the experimental plan to the laboratory; and~~

receiving at the first location experimental results obtained at the laboratory by applying the process conditions to a library of materials corresponding to the experiment matrix to transform at least one of the starting materials into a at least one product and applying the specified screening method.

40. (Currently amended) The method of claim ~~53~~ 39, wherein:

the experimental plan includes an estimate of time and/or cost to perform the set of experiments.

41. Cancelled.

42. (Currently amended) The method of claim ~~39~~ 41, wherein:

generating an experiment design includes selecting one or more ~~the starting materials are selected~~ from a list of materials in a remote material inventory.

43. (Currently amended) The method of claim ~~39~~ 41, wherein:

generating an experiment design includes selecting one or more ~~the processing conditions are selected~~ from a list of processing conditions that can be implemented by a remote process control system.

44. (Currently amended) The method of claim ~~39~~ 41, wherein:

generating an experiment design includes selecting a ~~the~~ screening method is selected from a list of screening methods that can be performed by one or more remote screening instruments.

45. (Currently amended) The method of claim 39 ~~41~~, wherein:
the screening method is automatically defined based on a selection of one or more of the starting materials and process conditions.

46. (Currently amended) The method of claim 39 ~~41~~, wherein:
the experiment design is communicated to the ~~remote~~ laboratory over a computer network.

Claims 47-50. Cancelled.

51. (Currently amended) A computer-readable storage medium tangibly embodying a research system program, the program comprising instructions operable to cause a programmable processor to:

provide to a remote user at a first location a computer-implemented experiment design tool for generating an experiment design defining a set of experiments, the experiment design including an experiment matrix having a plurality of matrix elements, one or more starting materials assigned to the matrix elements and one or more process conditions to be applied to the matrix elements, each of a plurality of matrix elements being defined by a unique combination of starting materials and/or process conditions, the experiment design also defining a screening method to be applied to generate experimental results;

receive at a second location a first user input including an experiment design generated by the experiment design tool, the second location being remote from the first location;

direct an automated synthesis instrument to prepare a library of materials corresponding to the experiment matrix, the library of materials having a plurality of members;

direct an automated instrument to apply the process conditions to the members of the library of materials to transform at least one of the starting materials into a at least one product;

direct an automated screening instrument to apply a first screening method defined by the first experiment design to generate experimental results; and
provide the experimental results to the remote user.

52. Cancelled.

53. (New) The method of claim 39, further comprising:

receiving at the first location an experimental plan describing a proposed execution of the set of experiments; and

if the proposed execution of the set of experiments is acceptable, communicating an approval of the experimental plan to the laboratory.

54. (New) The method of claim 53, wherein:

the experimental plan includes an indication whether the design conforms to a set of experiment parameters.

55. (New) The method of claim 53, wherein:

the experimental plan includes an indication whether the assigned starting materials specified in the first experiment design are present in an inventory of materials.

56. (New) The method of claim 53, wherein:

the experimental plan includes an indication whether the assigned starting materials have chemical or physical properties falling within a predetermined set of chemical or physical properties.

57. (New) The method of claim 39, further comprising:

in response to receiving the experimental results, generating a second experiment design defining one or more additional experiments;

communicating the second experiment design to the laboratory at the second location for execution; and

receiving at the first location additional experimental results obtained at the laboratory by execution of the additional experiments according to the second experiment design.

58. (New) The method of claim 39, wherein:

receiving the experimental results includes accessing a results database through a remote computer-implemented interactive user interface.

59. (New) The computer-readable storage medium of claim 51, further comprising instructions operable to cause a programmable processor to:

in response to providing the experimental results, receive a second user input including a second experiment design defining one or more additional experiments;
prepare a second library of materials based on the second experiment design;
apply one or more process conditions specified in the second experiment design to the members of the second library of materials to transform at least one of the starting materials into a product and apply a second screening method to generate additional experimental results; and

provide the additional experimental results to the remote user.

60. (New) The computer-readable storage medium of claim 59, wherein:

the second library of materials is a superset of the first library of materials.

61. (New) The computer-readable storage medium of claim 59, wherein:

the second screening method and the first screening method are different.

62. (New) The computer-readable storage medium of claim 51, wherein:

the computer-implemented experiment design tool includes an interactive user interface configured to enable the remote user to select materials from a list of materials in a remote material inventory.

63. (New) The computer-readable storage medium of claim 51, wherein:
the computer-implemented experiment design tool includes an interactive user interface configured to enable the user to select processing conditions from a list of processing conditions that can be implemented by a remote process control system.
64. (New) The computer-readable storage medium of claim 51, wherein:
the computer-implemented experiment design tool includes an interactive user interface configured to enable the user to select high throughput screening methods from a list of screening methods that can be performed by one or more screening instruments available at a remote laboratory location.
65. (New) The computer-readable storage medium of claim 51, wherein:
the computer-implemented experiment design tool includes an interactive user interface configured to access one or more databases of available materials, process conditions and high throughput screening methods.
66. (New) The computer-readable storage medium of claim 51, wherein:
the first screening method is automatically defined based on one or more of the starting materials and process conditions.
67. (New) The computer-readable storage medium of claim 51, further comprising instructions operable to cause a programmable processor to:
evaluate the first experiment design before preparing the library of materials to generate an experimental plan describing a proposed execution of the set of experiments;
and
provide the experimental plan to the remote user.
68. (New) The computer-readable storage medium of claim 51, wherein:
the experimental results are provided to the remote user in a results database accessible through a remote computer-implemented interactive user interface.

69. (New) The computer-readable storage medium of claim 51, wherein:
the experiment design tool is provided as a computer program to be executed by a computer system at the first location.

70. (New) The computer-readable storage medium of claim 51, wherein:
the experiment design tool is provided as a computer program executed by a server process running at the second location; and
the remote user accesses the experiment design tool using a client process running at the first location.

71. (New) A computer-readable storage medium tangibly embodying a program for obtaining experimental results for a set of experiments, the program comprising instructions operable to cause a programmable processor to:

generate at a first location an experiment design defining a set of experiments, the experiment design including an experiment matrix having a plurality of elements, one or more starting materials assigned to the matrix elements, and one or more process conditions to be applied to the matrix elements, each of a plurality of matrix elements being defined by a unique combination of starting materials and/or process conditions, the experiment design also defining a screening method to be applied to generate experimental results;

communicate the experiment design to a laboratory at a second location for execution, the second location being remote from the first location; and

receive at the first location experimental results obtained at the laboratory by applying the process conditions to a library of materials corresponding to the experiment matrix to transform at least one of the starting materials into at least one product and applying the specified screening method.

72. (New) The computer-readable storage medium of claim 71, further comprising instructions operable to cause a programmable processor to:

receive at the first location an experimental plan describing a proposed execution of the set of experiments; and

in response to input indicating that the proposed execution of the set of experiments is acceptable, communicate an approval of the experimental plan to the laboratory.

73. (New) The computer-readable storage medium of claim 72, wherein:
the experimental plan includes an estimate of time and/or cost to perform the set of experiments.

74. (New) The computer-readable storage medium of claim 72, wherein:
the experimental plan includes an indication whether the design conforms to a set of experiment parameters.

75. (New) The computer-readable storage medium of claim 72, wherein:
the experimental plan includes an indication whether the assigned starting materials specified in the first experiment design are present in an inventory of materials.

76. (New) The computer-readable storage medium of claim 72, wherein:
the experimental plan includes an indication whether the assigned starting materials have chemical or physical properties falling within a predetermined set of chemical or physical properties.

77. (New) The computer-readable storage medium of claim 71, wherein:
the instructions operable to cause a programmable processor to generate an experiment design include instructions operable to cause a programmable processor to receive input selecting one or more starting materials from a list of materials in a remote material inventory.

78. (New) The computer-readable storage medium of claim 71, wherein:

the instructions operable to cause a programmable processor to generate an experiment design include instructions operable to cause a programmable processor to receive input selecting one or more processing conditions from a list of processing conditions that can be implemented by a remote process control system.

79. (New) The computer-readable storage medium of claim 71, wherein:

the instructions operable to cause a programmable processor to generate an experiment design include instructions operable to cause a programmable processor to receive input selecting a screening method from a list of screening methods that can be performed by one or more remote screening instruments.

80. (New) The computer-readable storage medium of claim 71, wherein:

the screening method is automatically defined based on a selection of one or more of the starting materials and process conditions.

81. (New) The computer-readable storage medium of claim 72, wherein:

the experiment design is communicated to the laboratory over a computer network.

82. (New) The computer-readable storage medium of claim 71, further comprising instructions operable to cause a programmable processor to:

in response to receiving the experimental results, generate a second experiment design defining one or more additional experiments;

communicate the second experiment design to the laboratory at the second location for execution; and

receive at the first location additional experimental results obtained at the laboratory by execution of the additional experiments according to the second experiment design.

83. (New) The computer-readable storage medium of claim 71, wherein:

the instructions operable to cause a programmable processor to receive the experimental results include instructions operable to cause a programmable processor to access a results database through a remote computer-implemented interactive user interface.